

WHAT IS CLAIMED IS:

- 1                   1. A microdevice for supporting a flowing fluid, the microdevice  
2 comprising:
  - 3                   a substrate; and
  - 4                   a pair of generally parallel, spaced wall members on the substrate, wherein  
5 at least one of the wall members includes a pair of structures defining an opening.
- 1                   2. The microdevice of claim 1 wherein the pair of structures are  
2 beveled structures.
- 1                   3. The microdevice of claim 1 wherein the pair of structures are  
2 beveled structures, and wherein each of the beveled structures comprises a pair of  
3 inwardly tapering wall surfaces terminating in an apex.
- 1                   4. The microdevice of claim 3 wherein each of the tapering wall  
2 surfaces form an angle of about 2 degrees to about 20 degrees with respect to a side  
3 surface of an intermediate portion of the wall member.
- 1                   5. The microdevice of claim 3 wherein each tapering wall surfaces is  
2 curved.
- 1                   6. The microdevice of claim 1 wherein a distance between the pair of  
2 structures is about 50 microns to about 400 microns.
- 1                   7. The microdevice of claim 1 comprising three or more generally  
2 parallel wall members on the substrate.
- 1                   8. The microdevice of claim 1 wherein the spaced wall members  
2 define a fluid channel that contains a fluid with a laminar flow profile.
- 1                   9. The microdevice of claim 1 further comprising a cover disposed on  
2 the wall members.
- 1                   10. The microdevice of claim 1 wherein each of the wall members  
2 include an opening, and wherein the openings in the respective wall members are  
3 substantially aligned to form a slot.

1                   11.    The microdevice of claim 1 further comprising a slide member,  
2    wherein the slide member is disposed on the substrate and is adapted to slide through the  
3    opening.

1                   12.    An analytical assembly comprising:  
2                   the microdevice of claim 1; and  
3                   a probe having an end portion that is insertable between the spaced wall  
4    members.

1                   13.    A microdevice comprising:  
2                   a substrate;  
3                   a plurality of wall members; and  
4                   a plurality of fluid channels, wherein each of the fluid channels is defined  
5    by adjacent wall members in the plurality of wall members, wherein each wall member  
6    comprises an opening that is formed by opposed beveled structures of the wall member  
7    and that communicates the adjacent fluid channels.

1                   14.    The microdevice of claim 13 wherein the openings in the  
2    respective wall members are substantially aligned to form a slot.

1                   15.    The microdevice of claim 13 wherein the openings in each of the  
2    wall members are structured to permit fluids having a laminar profile flowing on opposite  
3    sides of respective wall members from intermixing.

1                   16.    The microdevice of claim 13 further comprising a cover on the  
2    wall members and a lid spaced from the cover.

1                   17. A method for detecting a characteristic of a fluid, the method  
2 comprising:  
3                   (a) inserting a probe into a fluid channel in a microdevice;  
4                   (b) detecting a characteristic of a first fluid flowing in the first fluid  
5 channel;  
6                   (c) moving the probe from the first fluid channel through an opening in  
7 one of the wall members defining the first fluid channel and to a second fluid channel  
8 adjacent to the first fluid channel; and  
9                   (d) detecting a characteristic of a second fluid flowing through the second  
10 fluid channel.

1                   18. The method of claim 17 wherein the probe comprises an electrical  
2 sensor.

1                   19. The method of claim 17 wherein at least the first fluid contains  
2 proteins.

1                   20. The method of claim 17 wherein each of the fluid channels has a  
2 width less than about 1000 microns.

1                   21. The method of claim 17 wherein the first and the second fluids  
2 comprise a laminar profile.

1                   22. The method of claim 17 wherein (b)-(d) are performed without  
2 exposing an end portion of the probe to air.

1                   23. An analytical assembly comprising:  
2                   a detection assembly comprising a plurality of detection devices; and  
3                   a microdevice comprising a plurality of wall members and a plurality of  
4 fluid channels, wherein each of the fluid channels is defined by adjacent wall members in  
5 the plurality of wall members.

1                   24. The analytical assembly of claim 23 wherein the plurality of  
2 detection devices comprise a plurality of probes.

1                   25.    The analytical assembly of claim 23 wherein the plurality of  
2    detection devices comprise a plurality of optical detectors.

3                   26.    The analytical assembly of claim 23 wherein the detection devices  
4    are disposed in the fluid channels in the microdevice.

1                   27.    A method for detecting a characteristic of a fluid, the method  
2    comprising:

3                   flowing a plurality of different fluids through respective fluid channels in a  
4    microdevice, each of the fluid channels in the microdevice being formed by adjacent pairs  
5    of wall members; and

6                   detecting characteristics of the plurality of different fluids substantially  
7    simultaneously using a plurality of detection devices as the different fluids flow through  
8    their respective fluid channels.

1                   28.    The method of claim 27 wherein the detection devices comprise a  
2    plurality of probes, wherein the plurality of probes is insertable within the plurality of  
3    fluid channels.